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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,193	02/13/2002	Shenlin Chen	MI22-1927	8017

21567 7590 12/18/2002

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EXAMINER

HUYNH, YENNHU B

ART UNIT PAPER NUMBER

2813

DATE MAILED: 12/18/2002

9

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/075,193

Applicant(s)

Examiner

Yennhu B Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 42-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 42-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 5
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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### DETAILED ACTION

Applicant's election without traverse of claims 42-48 Paper No. 8 is acknowledged.

Claims 1-41, 49-60 and 61-73 have been canceled filed on 2/13/02 , 8/30/02 and 11/20/02.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 42-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Al-Shareef et al. (U.S. 6,111,285) in view of Thakur (U.S. 6,255,159B1).

Al-Shareef et al. disclose a capacitor in DRAM, which include:

-Re. claim 42: forming a container struction comprising a first silicon containing layer and a second silicon containing layer 152; wherein the first silicon containing layer being more heavily doped with conductivity enhancing dopant than the second silicon containing layer; the second silicon containing layer defining and inner periphery of the container and the first silicon containing layer defining an outer periphery of the container; converting at least some of each of the first and second silicon containing layers to HSG silicon (col.4, lines 3-15); forming a

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dielectric material layer 154; forming a conductive material layer 156 over the dielectric material, the container struction and conductive material together defining capacitor structure. (fig.8, lines 16-43).

-Re. claim 48: wherein the second silicon containing layer is substantiall undoped (col.4, lines 10,11).

However, Al-Shareef et al. do not disclose the HSG from the first silicon layer is small average grain size than the HSG from the second silicon layer (cl.42); wherein the converting comprises silane gas and anneal the seeded layer at temperature about 550 C degrees, under  $1 \times 10^{-4}$  Torr, to about 3 minutes (cl.43), and the range of temperature and concentration dopant of the first and second silicon layer (cl. 44-47).

Thakur disclose a method to form HSG which include:

-Re. claim 42 It would be obvious to one having ordinary skill in the art that there various application and modification can be made, in forming the HSG from the first silicon layer is small average grain size than the HSG from the second silicon layer, because the seeding or grain size can be controlled by gas processing and selecting of any order of mixing ingredients. ✓

-Re. claim 43: converting comprises silane and annealed the seeded in range of 450 C – 700 C degrees, under 10-20 millitorr, by rapid thermal CVD (col.4, lines 29-31, col. 5, lines 3-22, col. 6, lines 10-14, and col. 7, lines 17-31).

-Re. claims 44-47: wherein the range of temperature and concentration dopant of the first silicon layer and the second silicon layer are about 450 C – 525 C degrees and  $10^{-3}$  Torr to  $10^{-1}$  Torr.

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Al-Shareef et al. by incorporating the forming of HSG from the first silicon layer is small average grain size than the HSG from the second silicon layer, to maximizing the capacitance per cell area without increasing the chip area of capacitor structure.

With respect to claims 44-47 the range of time, temperature and concentration dopant are considered to involve routine optimization while has been held to be within the level of ordinary skill in the art, As noted In re Aller 105 USPQ233, 255 (CCPA 1955)., the selection of reaction parameters such as temperature and concentration would have been obvious.

"Normally, it is to expected that a change in temperature, or in range, concentration, cycles, thickness, would be an unpatentable modification. Under some circumstance, however, changes such as these may be impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality ... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934)

### ***Conclusion***

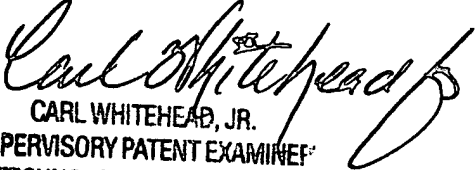
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu Huynh whose telephone number is (703)308-6110. The examiner can normally be reached on Monday-Friday from 8:00 AM to 4.30PM.

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If attempts to reach the examiner by telephone are unsuccessfully, the examiner's supervisor, Carl Whitehead, Jr., can be reached on (703) 308-4940. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

YNBH,  
12/5/02

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800